

should spend most of his time in keeping the equipment in first-class condition. The operators and help should wear white suits while on duty. Careful records of the operation of a plant should be kept and in large plants it is not only necessary, but it is economical to have a chemist and bacteriologist in charge of the plant.

The writer has yet to assist in building a plant which in general appearance and finish is up to what in his opinion an ideal plant should be. The inside finish of the operating room, for instance, is usually a concrete floor; brick walls, steel roof trusses and painted roof boards. The outside of a filter plant is usually constructed of brick, with slate roofs. Extra money spent for tile floors; marble, tile or terra cotta walls; parapet walls in front of the filters; attractive lighting schemes; ornamental receptacles for flowers or ferns; ceilings; and attractive radiators with concealed piping, would be money well spent.

It is possible to design the lines of the buildings to have some desirable architectural features and an architect should be employed for this purpose. The ground outside of the plant should be beautified to the fullest possible extent. Every possible consideration should be given to building plants of better appearance and finish. The incentive would be to keep such plants clean and attractive.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

THE plan which has been adopted by the Dominion Government for the promotion of scientific and industrial research in Canada may be briefly outlined as follows:—

The work will be under the direction of a committee of the Privy Council consisting of the Minister of Trade and Commerce, the Minister of the Interior, the Minister of Agriculture, the Minister of Mines, the Minister of Inland Revenue and the Minister of Labor.

The Minister of Trade and Commerce is the chairman of the committee, to whom all reports are to be made and who will be the medium of communication between the advisory council and the committee.

This committee will consider and decide upon the plans and recommendations submitted by the advisory council, the system under which the work is to be done and the expenditures that are to be made.

An Advisory Council of Experts.—To assist the committee, an advisory council of scientific experts and representatives of the business and industrial interests has been appointed by the government.

The members constituting the council are as follows: Dr. A. B. McCallum, University of Toronto, Toronto, chairman; Dr. A. Stanley Mackenzie, Dalhousie University, Halifax; Dr. F. D. Adams, McGill University, Montreal; Dr. R. F. Ruttan, McGill University, Montreal; Prof. J. C. McLennan, University of Toronto, Toronto; Prof. S. F. Kirkpatrick, Queen's University, Kingston; R. Hobson, Hamilton; R. A. Ross, Montreal; Tancrede Bienvenu, Montreal; J. B. Challies, Ottawa, secretary.

These gentlemen serve in an honorary capacity, and following in this respect the splendid example set out by the British Advisory Board, place their time, their scientific knowledge and experience and their business ability at the disposal of the government for the purpose set forth.

Procedure.—The Advisory Council matures its plans, organizes its methods of procedure and reports to the

committee of the Privy Council. When these are approved, the Advisory Council supervises and directs the work so authorized.

Plan of Work.—The work of the Advisory Council, acting in conjunction with the committee, will be along the following general lines, to be varied and extended as experience dictates:—

(a) To ascertain and tabulate the various agencies in Canada which are now carrying on scientific and industrial research in the universities and colleges, in the various laboratories of the government, in business organizations and industries, in scientific associations or by private or associated investigators.

(b) To note and schedule the lines of research or investigation that are being pursued by each such agency, their facilities and equipment therefor, the possibilities of extension and expansion, and particularly to ascertain the scientific man-power available for research and the necessity of adding thereto.

(c) To co-ordinate these agencies so as to prevent overlapping of effort, to induce co-operation and team work, and to build up a community of interest, knowledge and mutual helpfulness between each other.

(d) To make themselves acquainted with the problems of a technical and scientific nature that are met with by our productive and industrial interests, and to bring them into contact with the proper research agencies for solving these problems, and thus link up the resources of science with the labor and capital employed in production so as to bring about the best possible economic results.

(e) To make a scientific study of our common unused resources, the waste and by-products of our farms, forests, fisheries and industries, with a view to their utilization in new or subsidiary processes of manufacture and thus contributing to the wealth and employment of our people.

(f) To study the ways and means by which the present small number of competent and trained research men can be added to from the students and graduates of science in our universities and colleges, and to bring about in the common interest a more complete co-operation between the industrial and productive interests of the country and the teaching centres and forces of science and research.

(g) To inform and stimulate the public mind in regard to the importance and utility of applying the results of scientific and industrial research to the processes of production by means of addresses to business and industrial bodies, by the publication of bulletins and monographs, and such other methods as may seem advisable.

Proceeding along these lines carefully and wisely, the government hopes to render valuable assistance to a movement, the side expansion of which is not only vital to the proper development of our rich resources, but which is absolutely necessary in order to enable us to compete with progressive countries in the great race of national expansion.

For the year 1916 the Prussian State Railway authorities have ordered 1,600 locomotives, 1,700 passenger vehicles, 400 luggage vans and 38,000 goods wagons, and with a view to executing these requirements every locomotive and railway rolling stock firm in the country has received orders according to their highest capacity for output, but operations are seriously curtailed on account of the shortage of workmen. In several factories prisoners of war, mostly French and Belgians, are working under military supervision. They are mostly skilled laborers, who, before taking up arms, were employed in work of a similar kind. In normal times the German locomotive manufacturers can produce in the aggregate about 3,000 locomotives annually.